

Claims

[c1] 1. An implantable medical apparatus comprising an electrical device having a case and a non-conducting plate in said case and a plurality of electrical contacts on said plate, a lead having a distal end and a proximal end and carrying a plurality of electrical conductors, and a connector coupled to a proximal end of said lead, said connector having a non-conducting sheet conformed to said plate and a plurality of electrical contacts protruding from said sheet, each of said contacts being electrically connected to an electrical conductor in said lead and being spatially arranged to contact one of said electrical contacts on said plate, and at least one fastener coupling said connector to said electrical device.

[c2] 2. The implantable medical apparatus of claim 1 wherein each of said electrical contacts on said plate comprise a button exposed above said plate.

[c3] 3. The implantable medical apparatus of claim 1 wherein each of said electrical contacts on said sheet comprise a pin extending through said sheet.

- [c4] 4.The implantable medical apparatus of claim 3 wherein said pins comprise a bottom section and a flat section, said flat section extending above the sheet and split by a slot, one of said conductors of said lead being inserted in said slot of a pin.
- [c5] 5.The implantable medical apparatus of claim 4 further comprising a cap on said first and second tabs, said cap clamping said conductor in said slot.
- [c6] 6.The implantable medical apparatus of claim 3 wherein said pins comprise a cylindrical bottom section extending below the sheet, said cylindrical bottom section having a rounded distal end.
- [c7] 7.The implantable medical apparatus of claim 1 further comprising a compressible seal circumferentially surrounding said electrical contacts on said plate and on said sheet.
- [c8] 8.The implantable medical apparatus of claim 1 further comprising a deformable material applied between said electrical contacts of said sheet and said electrical contacts of said plate, said deformable material being forced from between electrical contacts on said sheet and on said plate as said connector is attached to said electrical device.

- [c9] 9.The implantable medical apparatus of claim 8 wherein said material is non-conducting.
- [c10] 10.The implantable medical apparatus of claim 8 wherein said material is a directionally conducting polymer.
- [c11] 11.The implantable medical apparatus of claim 1 wherein said connector further comprises a lumen opening into said lead such that a stylet can be inserted through said lumen into said lead, said electrical contacts on said sheet on said connector being placed on either side of said lumen.
- [c12] 12.The implantable medical apparatus of claim 1 wherein said sheet has an upper side and a lower side, said electrical contacts being exposed through said lower side and protruding through said upper side, each of said electrical contacts being electrically coupled to a conductor of said lead near said upper side of said sheet, and wherein at least said upper side of said sheet is encapsulated in a biocompatible polymer.
- [c13] 13.The implantable medical apparatus of claim 1 wherein said electrical device comprises a cardiac stimulator having means for stimulating the heart of a patient, and wherein said lead has a plurality of electrodes near

said distal end of said lead, each electrode electrically coupled to an electrical conductor.

- [c14] 14. A lead for an implantable medical apparatus, said lead comprising
 - an elongated lead body having a distal end and a proximal end,
 - a plurality of electrodes near said distal end of said lead body,
 - a plurality of electrical conductors, and
 - a connector coupled to a proximal end of said lead, said connector having a non-conducting sheet and a plurality of electrical contacts protruding from said sheet, each of said contacts being electrically connected to an electrical conductor in said lead.
- [c15] 15. The lead of claim 14 wherein each of said electrical contacts on said sheet comprise a pin extending through said sheet.
- [c16] 16. The lead of claim 15 wherein said pins comprise a bottom section and a flat section, said flat section extending above the sheet and being split by a slot, one of said conductors of said lead being inserted in said slot of a pin.
- [c17] 17. The lead of claim 16 wherein said flat section of said

pins comprises a first tab and a second tab, said tabs being separated by said slot and said second tab being longer than said first tab.

- [c18] 18. The lead of claim 17 further comprising a cap on said first and second tabs, said cap clamping said conductor in said slot.
- [c19] 19. The lead of claim 15 wherein said pins comprise a cylindrical bottom section extending below the sheet, said cylindrical bottom section having a rounded distal end.
- [c20] 20. The lead of claim 14 further comprising a compressible seal circumferentially surrounding said electrical contacts on said sheet.
- [c21] 21. The lead of claim 14 wherein said connector further comprises a lumen opening into said lead body such that a stylet can be inserted through said lumen into said lead body and said electrical contacts on said sheet are disposed on either side of said lumen.
- [c22] 22. The lead of claim 14 wherein said sheet has an upper side and a lower side, said electrical contacts being exposed through said lower side and protruding through said upper side, each of said electrical contacts being electrically coupled to a conductor of said lead near said

upper side of said sheet, and wherein at least said upper side of said sheet is encapsulated in a biocompatible polymer.